



Attachment 4

PTO/SB/21 (08-00)

Approved for use through 10/31/2002. OMB 0651-0031

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<h2 style="margin: 0;">TRANSMITTAL FORM</h2> <p style="margin: 0;">(to be used for all correspondence after initial filing)</p>	Application Number	10/064,355	
	Filing Date	07/04/2002	
	First Named Inventor	Kung-Yu Hsu	
	Group Art Unit		
	Examiner Name		
Total Number of Pages in This Submission	28	Attorney Docket Number	AMIP0016USA

ENCLOSURES (check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input checked="" type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/ Incomplete Application <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Assignment Papers (for an Application) <input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____	<input type="checkbox"/> After Allowance Communication to Group <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to Group (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
<div style="border: 1px solid black; width: 100px; height: 20px; margin-bottom: 5px;"></div> Remarks		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	WINSTON HSU
Signature	<i>Winston Hsu</i>
Date	3/25/2003

CERTIFICATE OF MAILING		
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, DC 20231 on this date: <span style="border: 1px solid black; display: inline-block; width: 100px; height: 15px;"></span>		
Typed or printed name		
Signature		Date

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PTO/SB/17 (01-03)  
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# FEE TRANSMITTAL for FY 2003

Effective 01/01/2003. Patent fees are subject to annual revision.

Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 0.00

### Complete if Known

Application Number	10/064,355
Filing Date	07/04/2002
First Named Inventor	Kung-Yu Hsu
Examiner Name	
Art Unit	
Attorney Docket No.	AMIP0016USA

### METHOD OF PAYMENT (check all that apply)

Check  Credit card  Money Order  Other  None

Deposit Account:

Deposit Account Number: 50-0801  
 Deposit Account Name: North America International Patent Office

The Commissioner is authorized to: (check all that apply)

Charge fee(s) indicated below  Credit any overpayments  
 Charge any additional fee(s) during the pendency of this application  
 Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

### FEE CALCULATION

#### 1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1001 750	2001 375	Utility filing fee	
1002 330	2002 165	Design filing fee	
1003 520	2003 260	Plant filing fee	
1004 750	2004 375	Reissue filing fee	
1005 160	2005 80	Provisional filing fee	
SUBTOTAL (1)			(\$) 0.00

#### 2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims	Extra Claims	Fee from below	Fee Paid
Independent Claims	-20** =	X	=
Multiple Dependent	-3** =	X	=

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1202 18	2202 9	Claims in excess of 20	
1201 84	2201 42	Independent claims in excess of 3	
1203 280	2203 140	Multiple dependent claim, if not paid	
1204 84	2204 42	** Reissue independent claims over original patent	
1205 18	2205 9	** Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2)			(\$) 0.00

\*\*or number previously paid, if greater; For Reissues, see above

### FEE CALCULATION (continued)

#### 3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid
1051 130	2051 65	Surcharge - late filing fee or oath	
1052 50	2052 25	Surcharge - late provisional filing fee or cover sheet	
1053 130	1053 130	Non-English specification	
1812 2,520	1812 2,520	For filing a request for <i>ex parte</i> reexamination	
1804 920*	1804 920*	Requesting publication of SIR prior to Examiner action	
1805 1,840*	1805 1,840*	Requesting publication of SIR after Examiner action	
1251 110	2251 55	Extension for reply within first month	
1252 410	2252 205	Extension for reply within second month	
1253 930	2253 465	Extension for reply within third month	
1254 1,450	2254 725	Extension for reply within fourth month	
1255 1,970	2255 985	Extension for reply within fifth month	
1401 320	2401 160	Notice of Appeal	
1402 320	2402 160	Filing a brief in support of an appeal	
1403 280	2403 140	Request for oral hearing	
1451 1,510	1451 1,510	Petition to institute a public use proceeding	
1452 110	2452 55	Petition to revive - unavoidable	
1453 1,300	2453 650	Petition to revive - unintentional	
1501 1,300	2501 650	Utility issue fee (or reissue)	
1502 470	2502 235	Design issue fee	
1503 630	2503 315	Plant issue fee	
1460 130	1460 130	Petitions to the Commissioner	
1807 50	1807 50	Processing fee under 37 CFR 1.17(q)	
1806 180	1806 180	Submission of Information Disclosure Stmt	
8021 40	8021 40	Recording each patent assignment per property (times number of properties)	
1809 750	2809 375	Filing a submission after final rejection (37 CFR 1.129(a))	
1810 750	2810 375	For each additional invention to be examined (37 CFR 1.129(b))	
1801 750	2801 375	Request for Continued Examination (RCE)	
1802 900	1802 900	Request for expedited examination of a design application	
Other fee (specify)			
*Reduced by Basic Filing Fee Paid			
SUBTOTAL (3)			(\$) 0.00

### SUBMITTED BY

Name (Print/Type)	Winston Hsu	Registration No. (Attorney/Agent)	41,526	Telephone	886289237350
Signature	<i>Winston Hsu</i>	Date	3/25/2003		

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

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Substitute for form 1449A/PTO <h2 style="text-align: center;">INFORMATION DISCLOSURE STATEMENT BY APPLICANT</h2> <p style="text-align: center;"><small>(use as many sheets as necessary)</small></p>		<b>Complete if Known</b>					
		Application Number	101064, 355				
		Filing Date	07/04/2002				
		First Named Inventor	Kuang-Yu Hsu				
		Art Unit					
		Examiner Name					
Sheet		of				Attorney Docket Number	AMIP0016 USA

U.S. PATENT DOCUMENTS						
Examiner Initials*	Cite No. <sup>1</sup>	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code <sup>2</sup> ( <i>if known</i> )				
		US-				
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FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Country Code <sup>3</sup>	Number <sup>4</sup> - Kind Code <sup>5</sup> ( <i>if known</i> )				
	1	TW	251757	07/11/1995	General Semiconductor of Taiwan, LTD.		†

Examiner Signature		Date Considered	
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.  
<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

5 Applicants: Kuang-Yu Hsu  
Chih-Hung Cheng

Filing Date: 07/04/2002 Art Unit:

Serial No.: 10/064,355 Docket No.: AMIP0016USA

10

Title: Voltage-Controlled Capacitor Circuit and Related  
Circuitry with Diode and MOS Varactors

To: Assistant Commissioner for Patents  
15 Washington, D.C. 20231

Subject: 1. Information disclosure statement under 37  
C.F.R. §1.56.

20

2. Petition to request consideration of the  
information disclosure statement.

Dear Sir/Madam:

25

This is an Information Disclosure Statement in accordance  
with the duty to disclose information material to patentability  
under 37 C.F.R. §1.56. The applicant wishes to make of record  
each of the documents listed on the accompanying form PTO/SB/08.  
It is respectfully requested that the examiner initial each  
30 of the cited references on the form and that it be made of  
record in the application and that a copy of the initialed  
form be sent to the applicant with the next communication from

the examiner.

Since the IDS is filed before the mailing date of a first Office action on the merits, a petition to request consideration  
5 of the information disclosure statement is hereby requested according to 37 C.F.R. §1.97(b). The prior art patents contained in the information disclosure statement were cited in communications from the Taiwan Intellectual Property Office on 02/07/2002 regarding the applicant's Taiwan application  
10 091108587. The applicant sincerely hopes that the examiner can consider each of the items contained in the information disclosure statement.

According to the requirement set forth in 37 C.F.R. §1.98  
15 and MPEP 609, the applicant is submitting copies of the cited references (Taiwan Patent No.251757) and a concise explanation of the relevance to this application.

TP No.251757 discloses a self-oscillating mixer (SOM). A  
20 dual conversion system shown in Fig.1 includes a radio-frequency (RF) amplifier 31, a first mixer 32, a first local oscillator (connected to the mixer 32), a high intermediate-frequency (IF) filter 34, a high intermediate-frequency amplifier 35, an SOM 1, an  
25 intermediate-frequency filter 38, and an intermediate-frequency amplifier 39. The dual conversion system is used to convert a radio-frequency input signal to an intermediate-frequency output signal. The SOM 1 acts as a mixer combined with a local oscillator, and has an amplifier  
30 11 and a feedback oscillation network 12. The amplifier 11 is made of a single NPN transistor, and the feedback oscillation network 12 could include inductors L, capacitors C, and a

varactor diode. The feedback oscillation network 12 is thus a voltage-controlled oscillation (VCO) network. By the modulation capability of the amplifier 11 and the oscillation capability of the feedback oscillation network 12, the SOM 5 1 could be used as a self-oscillating mixer.

The aforementioned art is cited by the Taiwan PTO in the office action regarding the applicant's Taiwan application since it discloses a VCO with an NPN transistor in the amplifier 10 11 and a varactor in the feedback oscillation network 12. However, what the present application discloses is a combination of two different kinds of varactors. One kind of varactor is made of a MOS transistor and the other kind is made of a PN junction transistor (such as a BJT or diode). These two kinds of varactors 15 have different voltage-controlled capacitance characters (shown in Figs. 2A and 3 of the application). The application discloses various ways of appropriately combining these varactors to form various voltage-controlled capacitance characters, such as those shown in Figs. 5 and 8A-8D of the 20 present application. Since the cited art fails to make use of MOS transistor varactors, it cannot gain benefit from the voltage-controlled capacitance characters of the MOS varactors.

25 Claim 1 of the present application includes the above-described differences in the limitations as recited below:

- 30 1. A voltage-controlled capacitor circuit having a first output end and a second output end for forming a capacitor between the first output end and the second output end, the voltage-controlled capacitor circuit comprising:

a **first varactor** having two ends, wherein one end is connected to the first output end; the first varactor **comprising a metal oxide semiconductor (MOS) transistor**, having a source electrode and a drain electrode that are connected to one end of the first varactor, and a gate electrode that is connected to the other end of the first varactor; a first bias voltage being applied to one end of the first varactor and a first control voltage being applied to the other end of the first varactor; a capacitance between the two ends of the first varactor changing according to a difference between the first bias voltage and the first control voltage; and

a **second varactor** having two ends, wherein one end is connected to the second output end; the second varactor **comprising a transistor electrically connected between the two ends of the second varactor for forming a PN-junction** between the two ends of the second varactor; a second bias voltage being applied to one end of the second varactor and a second control voltage being applied to the other end of the second varactor; a capacitance between the two ends of the second varactor changing according to a difference between the second bias voltage and the second control voltage.

Claim 18 of the present application includes the above-described differences in the limitations as recited below:

18. An oscillator for providing an oscillating signal comprising:
  - a voltage-controlled capacitor circuit having a first output end and a second output end for forming a capacitor

between the first end and the second end comprising:  
**a first varactor** having two ends, wherein one end is connected  
to the first output end; the first varactor **comprising**  
5 **a MOS transistor**, having a source electrode and a drain  
electrode that are connected to one end of the first  
varactor, and a gate electrode that is connected to the  
other end of the first varactor; a first bias voltage  
being applied to one end of the first varactor and a  
10 first control voltage being applied to the other end  
of the first varactor; a capacitance between the two  
ends of the first varactor changing according to a  
difference between the first bias voltage and the first  
control voltage; and

**a second varactor** having two ends, wherein one end is  
15 connected to the second output end; the second varactor  
**comprising a transistor electrically connected between**  
**the two ends of the second varactor for forming a**  
**PN-junction** between the two ends of the second varactor;  
a second bias voltage being applied to one end of the  
20 second varactor and a second control voltage being  
applied to the other end of the second varactor; a  
capacitance between the two ends of the second varactor  
changing according to a difference between the second  
bias voltage and the second control voltage.

25 an inductor electrically connected to the  
voltage-controlled capacitor circuit;  
an oscillating circuit comprising an oscillating input end  
for receiving an oscillating input signal, and an  
oscillating output end electrically connected to the  
30 inductor and to the voltage-controlled capacitor  
circuit for changing a phase of the oscillating input  
signal according to a resonance effect generated between



the inductor and the capacitor connected between the first input end and the second input end, and for feeding back the phase-changed oscillating input signal to the oscillating input end to generate the oscillating signal.

5

From the above it can be seen that the present application is substantially different from the teachings of TP No. 251757. Claims 2-17 are dependant on claim 1 and claims 19-27 are dependent on claim 18, and thus also include these differentiating limitations.

10

15 Sincerely,

Winston Hsu

Date: 3/25/2003

20

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